

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
23 August 2001 (23.08.2001)

(10) International Publication Number
PCT
WO 01/60974 A3

- (51) International Patent Classification⁷: C12N 1/00, A23J 1/00, 3/20
- (21) International Application Number: PCT/GB01/00628
- (22) International Filing Date: 15 February 2001 (15.02.2001)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
0003620.2 16 February 2000 (16.02.2000) GB
- (71) Applicant (for all designated States except US): NORFERM DA [NO/NO]; P.O. Box 8005, N-4068 Stavanger (NO).
- (71) Applicant (for GB only): GOLDING, Louise [GB/GB]; Frank B. Dehn & Co., 179 Queen Victoria Street, London EC2V 4EL (GB).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): JOHANNESSEN, Arild [NO/NO]; Norferm DA, P.O. Box 8005, N-4068 Stavanger (NO). KLEPPE, Gunnar [NO/NO]; Norferm DA, P.O. Box 8005, N-4068 Stavanger (NO). LARSEN, Jan [DK/DK]; Novozymes, Hallas Alle, DK-4400 Kalundborg (DK). MOEN, Einar [NO/NO]; Norferm DA, P.O. Box 8005, N-4068 Stavanger (NO).
- (74) Agents: GOLDING, Louise et al.; Frank B. Dehn & Co., 179 Queen Victoria Street, London EC4V 4EL (GB).
- (81) Designated States (national): AE, AG, AL, AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- (88) Date of publication of the international search report:
14 March 2002
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 01/60974 A3

(54) Title: METHOD FOR AN EXTRACTION OF PROTEINS FROM A SINGLE CELL

(57) Abstract: The present invention provides a process for imparting improved functional properties to a single-cell protein material, said process comprising the step of homogenizing an aqueous slurry of the single-cell protein, e.g. a single-cell protein material derived from fermentation on natural gas. The resulting homogenized protein material has excellent functional properties and finds particular use in the preparation of food products, for example as a gelling agent or emulsifier.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 01/00628

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12N1/00 A23J1/00 A23J3/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C12N A23J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|------------------------|
| X | MIDDELBERG A P J: "Process-scale disruption of microorganisms", BIOTECHNOLOGY ADVANCES, GB, ELSEVIER PUBLISHING, BARKING, VOL. 13, NR. 3, PAGE(S) 491-551 XP004045404 ISSN: 0734-9750 page 509, paragraph 2 -page 528, paragraph 1 | 1-19 |
| X | WO 91 01367 A (BIOENG INC) 7 February 1991 (1991-02-07) abstract page 3, paragraph 5 -page 4, paragraph 2 page 8, paragraph 2 figure ALL claims 19,32-46 --- -/-- | 1-6, 8-10, 15-19 |



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

8 August 2001

Date of mailing of the international search report

22/08/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

Keller, Y

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 01/00628

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | FR 2 311 091 A (BRITISH PETROLEUM CO) 10 December 1976 (1976-12-10) page 1, paragraph 2 -page 2, paragraph 4 page 4, paragraph 3 -page 6, paragraph 1; claim ALL ---- | 10-19 |
| X | WO 91 02463 A (GEN FOODS INC) 7 March 1991 (1991-03-07) page 13, paragraph 3; claim 1 ---- | 1-19 |
| A | US 4 678 677 A (SUGISAWA KO ET AL) 7 July 1987 (1987-07-07) the whole document ----- | 1-19 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 01/00628

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|----------------------------|---------------------|
| WO 9101367 A | 07-02-1991 | US 5380826 A | 10-01-1995 |
| FR 2311091 A | 10-12-1976 | BE 841867 A | 16-11-1976 |
| | | NL 7605107 A | 16-11-1976 |
| | | SU 667154 A | 05-06-1979 |
| | | ZA 7602607 A | 28-12-1977 |
| WO 9102463 A | 07-03-1991 | US 5011701 A | 30-04-1991 |
| | | AT 137917 T | 15-06-1996 |
| | | AU 638751 B | 08-07-1993 |
| | | AU 6352590 A | 03-04-1991 |
| | | AU 643706 B | 25-11-1993 |
| | | AU 6428290 A | 03-04-1991 |
| | | CA 2059524 A | 19-02-1991 |
| | | CA 2059544 A,C | 19-02-1991 |
| | | DE 69027034 D | 20-06-1996 |
| | | DE 69027034 T | 26-09-1996 |
| | | EP 0487639 A | 03-06-1992 |
| | | EP 0487649 A | 03-06-1992 |
| | | ES 2088433 T | 16-08-1996 |
| | | IE 902982 A | 27-02-1991 |
| | | IE 902983 A | 27-02-1991 |
| | | JP 4507348 T | 24-12-1992 |
| | | JP 4507349 T | 24-12-1992 |
| | | KR 140069 B | 01-06-1998 |
| | | NO 920581 A | 26-03-1992 |
| | | NO 920582 A | 09-04-1992 |
| | | PH 26991 A | 28-12-1992 |
| | | PT 95027 A | 18-04-1991 |
| | | PT 95028 A,B | 18-04-1991 |
| | | WO 9102461 A | 07-03-1991 |
| | | US 5215778 A | 01-06-1993 |
| US 4678677 A | 07-07-1987 | JP 1775917 C | 28-07-1993 |
| | | JP 4064662 B | 15-10-1992 |
| | | JP 61019464 A | 28-01-1986 |
| | | CA 1226469 A | 08-09-1987 |
| | | GB 2163036 A,B | 19-02-1986 |
| | | JP 6008661 A | 18-01-1994 |
| | | KR 8903248 B | 30-08-1989 |